REMARKS

1. The Amendments and the Support Therefor

No claims have been canceled, seven new claims (48-54) have been added, and claim 41 has been amended to leave claims 34 and 36-54 in the application. No new matter has been added by the amendments or new claims, which find support at the following portions of the application:

Claim 48:	Page 3 lines 28-29
Claim 49:	Page 3 line 20-page 5 line 4
Claim 50:	Claim 34 and the foregoing claims 48, 49 (page 3 line 20-page 5 line 4)
Claim 51:	Claims 34 and 38
Claim 52:	Claim 39
Claim 53:	Claim 42
Claim 54:	Claim 43

Further comments regarding the new claims are set out below at Section 4 of this Response.

2. Information Disclosure Statement (Form PTO-1449)

In any subsequent Office Action, please confirm receipt of the Information Disclosure Statement (IDS) filed on October 22, 2004.

3. Page 4 of the Office Action: Rejection of Claims 41 and 47 under 35 USC §112(2)

Claim 41 is corrected to depend from claim 40, which recites "a second electrically conducting layer" and thereby provides antecedent basis for claim 41.

Regarding claim 47, please note that this claim depends from claim 46, which also recites "a second electrically conducting layer." Thus, the recitation in claim 47 has antecedent basis.

4. Page 5 of the Office Action: Rejection of Claims 34 and 36-47 under 35 USC §102(e) in view of U.S. Patent 6,051,645 to *Suzuki*

4.a. §102(e) Rejection of Claim 34 in view of U.S. Patent 6,051,645 to *Suzuki*

Regarding claim 34, please note that this claim does not merely recite a "ink for use in a lithographic printing process" (as suggested at the bottom of page 5 of the Office Action, which states that this intended use does not distinguish the ink from *Suzuki*). Rather, claim 34 recites a "*lithographic ink* for use in a lithographic printing process" – i.e., the ink is explicitly recited to be a lithographic ink, rather than merely a generic "ink," or an inkjet ink (as in *Suzuki*). The difference is important, since lithographic inks are *inherently compositionally very different* from inkjet inks in several respects, thereby differentiating claim 34 from *Suzuki* (which *only* describes inkjet inks, as should be apparent from a brief review of *Suzuki*).

Initially, note that a conventional inkjet ink, being provided in an aqueous carrier (see, e,g, *Suzuki* at column 1 lines 42-45, column 2 lines 17-20, column 7 lines 57-60, etc.), is inherently *hydrophilic* (miscible in water), else it would separate from water and would not function in an inkjet process. Inkjet inks are sprayed either by a thermal process, i.e., ink is vaporized to eject onto paper, or an ultrasonic process, i.e., ink is mechanically "shaken" out of a nozzle. (For a simple review of inkjet processes, see, e.g., http://computer.howstuffworks.com/inkjet-printer3.htm, a copy of which accompanies this Response). In either case, the inkjet ink must be highly fluid (nonviscous), and may need to be easily vaporized. In either case, a high water content is needed for the inkjet ink.

In contrast, a conventional lithographic ink is inherently *hydrophobic*: it is used in an offset printing process which *requires* that the ink repel water, and thus contain little or no water. See, e.g., U.S. Patent 5,948,843 ("Lithographic Ink") at column 1 lines 26-31:

> Lithographic printing inks are used in a number of printing processes, such as offset lithography, in which the image areas of a plate are treated to accept greasy inks and repel water, while the nonimage areas of the plate accept water and repel ink. ***A lithographic printing ink is preferably soluble in organic solvents and strongly hydrophobic.***

(Emphasis added.) See also, for example, the discussion at page 6 of the April 2, 2003 Response,

which reviewed the lithographic printing process. A concise review is also provided at http://people.howstuffworks.com/offset-printing2.htm (a copy of which accompanies this Response):

> Offset lithography works on a very simple principle: ink and water don't mix. Images (words and art) are put on plates (see the next section for more on this), which are dampened first by water, then ink. The ink adheres to the image area, the water to the non-image area. Then the image is transferred to a rubber blanket, and from the rubber blanket to paper. That's why the process is called "offset" -- the image does not go directly to the paper from the plates, as it does in gravure printing. . . .

In addition, a conventional lithographic ink is quite thick – it must not easily run when transferred from the plate to the blanket, and from the blanket to the print media – and thus a lithographic ink is often characterized as a "paste." See, for example, the aforementioned U.S. Patent 5,948,843 at column 1 line 19 (noting that the lithographic ink "forms a paste"); U.S. Patent 5,811,481 ("Lithographic Ink") at column 1 lines 14-15, describing a lithographic ink as a "gel or paste"; U.S Patent 4,255,196 ("Lithographic ink of reduced volatile solvent content for reducing atmospheric pollution") at column 1 lines 29-31 ("[l]ithographic inks of commerce are high viscosity *paste* inks comprised mainly of colored pigment, binder resin, or resinous vehicle and solvent"); etc. See also http://www.techsolve.org/p2iris/printing/2313-s.htm (a copy of which accompanies this Response):

> ***Sheetfed offset lithographic inks have a paste-like consistency*** and differ from most other types of inks (such as flexographic or gravure inks) in that they normally dry by oxidation/polymerization and adsorption (into the substrate) rather than by evaporation (i.e., evaporating the solvent portion of an ink).

(Emphasis added.)[1] To illustrate, note that the lithographic ink of the present application is described as containing 50-90% by weight of "metal or carbon particulate material" (see page 3 lines 28-29 of the specification), and thus has less than 50% of other materials (including any water) – in short, the lithographic ink is described as having a high solids content and low liquid

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[1] Note how this passage also describes another key difference between lithographic inks, which dry chemically, and inkjet inks, which dry by evaporation of the carrier medium to leave the pigment.

content. In contrast, the *Suzuki* inkjet ink contains far more water (generally 70%, see columns 15-16) and less solids (with 1-20% pigment/particulates content by weight, and preferably 2-10% by weight, see column 8 lines 65-67). The higher percentage of water and lower percentage of pigment/particulates in inkjet ink (such as that of *Suzuki*) is necessary to allow easy ink ejection (as discussed above), and to avoid clogging of the inkjet nozzles (see the Abstract of *Suzuki*).

Thus, owing to its affinity to water and its thinness, a water-based inkjet ink could not work as a conventional lithographic ink. Similarly, a lithographic ink is too hydrophobic and thick to serve as a conventional inkjet ink. It should therefore be appreciated that the initial "lithographic ink" limitation in claim 34 is *not* a mere statement of use, but is rather a recitation which characterizes the fundamental properties of the ink and differentiates it from other inks (such as that of *Suzuki*). Note, for example, MPEP 2111.02 ("Any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation"). Thus, the recited lithographic ink is not anticipated by the inkjet ink of *Suzuki*.

Additionally, for the reasons discussed above, *Suzuki* also does not render the present claims obvious: one would not look to *Suzuki* to address issues related to lithographic inks, since the properties of inkjet and lithographic inks are so different that an ordinary artisan would not regard an inkjet ink (which, as noted above, is hydrophilic, has high water, and is thin) as providing useful properties for a lithographic ink (which is hydrophobic, has little to no water, and is thick). In this respect, it is also notable that while the Office Action states (at page 5) that all of the recited contents of the lithographic ink of claim 34 are disclosed by *Suzuki*, it is questionable whether *Suzuki* truly describes or suggests the *specific combination* recited in claim 34. For each possible component of *Suzuki*'s inkjet inks, *Suzuki* sets forth a huge list of possible components: *hundreds* of possible "dispersants" are noted at column 4 line 39-column 7 line 27 (with polyamides being noted in passing at column 5 line 35); *hundreds* of possible pigments are noted at column 7 line 61-column 8 line 67 (with "carbon black" being noted in passing at column 7 line 64 *solely as one example of a black pigment*); and dozens of organic solvents (column 9 lines 11-32), with an antioxidant being noted as optional (column 9 lines 44-47). Thus, we submit that the lithographic ink of claim 34 cannot be regarded as obvious in view of *Suzuki*'s inkjet ink

unless an improper "obvious to try" rationale is used (MPEP 2145). An "obvious to try" situation arises where the prior art illustrates a number of potential solutions to the problem the claimed invention seeks to solve with one or more of these solutions corresponding to the one(s) implemented by the claimed invention, but there is no objective suggestion to an ordinary artisan to choose the particular solution implemented by the Applicant. In other words, an improper "obvious to try" rejection asserts that it would be obvious to implement a feature claimed by the Applicant simply because the prior art contains this feature (among others), but the prior art does not provide any true and rational basis for an ordinary artisan to choose the particular feature in question:

> [3] The admonition that "obvious to try" is not the standard under §103 has been directed mainly at two kinds of error. In some cases, what would have been "obvious to try" would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful. In others, what was "obvious to try" was to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it.

In re O'Farrell, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988) (citations omitted).[2] Many cases discussing the impropriety of the obvious to try rationale have explained that the prior art must, when considered objectively, provide motivation to construct the specific claimed invention; a general and "unfocused" motivation will not suffice.[3] Here, owing to the differences between

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[2] See also *In re Eli Lilly & Co.*, 14 USPQ2d 1741, 1743 (Fed. Cir. 1990) ("An 'obvious-to-try' situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain directions were pursued.)

[3] For cases finding lack of a prima facie case of obviousness on this bases, see, e.g., *In re Deuel*, 34 USPQ2d 1210, 1215 (Fed. Cir. 1995), "While the *general* idea of the claimed molecules.... may have been obvious from Bohlen's teachings.... the *precise* cDNA molecules of claims 5 and 7 would not have been obvious....." *(emphasis added)*; *Ex parte Obukowicz*, 27 USPQ2d 1063, 1065 (Bd. Pat. App. & Int. 1992), "The Dean statement is of the type that gives only *general* guidance and is not at all specific as to the *particular* form of the claimed invention

lithographic and inkjet inks, and the lack of any suggestion whatsoever that the specific combination noted in claim 34 would yield any particular advantages (as an inkjet ink *or* as a lithographic ink), we submit that claim 34 is also not obvious in view of *Suzuki*.

4.b. §102(e) Rejection of Claims 36-47 in view of U.S. Patent 6,051,645 to *Suzuki*

Claims 36-47 stand rejected because the Office Action alleges they do not "compositionally distinguish the ink from the prior art." However, *Suzuki* plainly *does not* disclose the recited structure, nor does *Suzuki* in any way suggest it (particularly insofar as *Suzuki* is a conventional inkjet ink). Kindly withdraw these rejections since the Office Action's approach ignores clearly recited claim limitations, and is thus improper because the entirety of the claim must be considered. See, e.g., *In re Lowry*, 32 USPQ2d 1031, 1034 (Fed. Cir. 1994) ("The Patent and Trademark Office (PTO) must consider all claim limitations when determining patentability of an invention over the prior art"); *Ex parte Maizel*, 27 USPQ2d 1662, 1664 (Bd. Pat. App. & Int., 1992) ("[E]very limitation positively recited in a claim must be given effect in order to determine what subject matter that claim defines"). Anticipation under 35 U.S.C. §102(b) requires that *each and every* limitation recited by the claim be found in a single prior art reference, a condition which is not met by *Suzuki* with regard to claims 36-47.[4]

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and how to achieve it" *(emphasis added)*. See also *Ex parte Goldgaber*, 41 USPQ2d 1172, 1177 (Bd. Pat. App. & Int. 1995), wherein the claimed invention was found obvious: "Here, the combined teachings of Glenner and Huynh provide much more than a *general* disclosure which 'may pique the scientist's curiosity'. Glenner puts a person having ordinary skill in possession of two sets of fully degenerate probes, and Huynh discloses *specific* information pertaining to the construction and screening of a suitable cDNA library." *(Emphasis added.)*

[4] MPEP 2131. "To anticipate, *every element and limitation* of the claimed invention must be found in a single prior art reference, arranged as in the claim" (*Brown v. 3M*, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001); see also *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001); *Sandt Technology Ltd. v. Resco Metal and Plastics Corp.*, 60 USPQ2d 1091, 1094 (Fed. Cir. 2001)).

5. New Claims 48-54

5.a. Claims 48-50

Regarding new claims 48-50, these are added to more clearly differentiate the claimed inks from those of *Suzuki*, as per the points noted in Section 4.a above.

Claim 48 addresses the point that *Suzuki* is a thin and "watery" ink, whereas the claimed lithographic ink is far thicker. As discussed in the foregoing Section 4.a, the claimed arrangement is neither described nor suggested by *Suzuki*.

Claim 49 addresses the fact that *Suzuki*'s inkjet ink is plainly hydrophilic (since it is primarily formed of water), whereas the claimed lithographic ink must be hydrophobic (as it must be in order to serve as a lithographic ink). As discussed in the foregoing Section 4.a, the claimed arrangement is neither described nor suggested by *Suzuki*.

Claim 50, which combines claim 34 with claims 48 and 49, addresses both of these points.

5.b. Claims 51-54

Regarding new claims 51-54, these claims further address the Office Action's view (at pages 5-6 of the Office Action) that claims 36-47 do not "compositionally distinguish" the recited ink. Claims 51-54 recast these claims as article of manufacture claims wherein the matter in question is now plainly recited as a structural limitation which must be given weight. These claims are therefore structurally distinguished from *Suzuki*.

6. In Closing

If any questions regarding the application arise, please contact the undersigned attorney. Telephone calls related to this application are welcomed and encouraged. The Commissioner is authorized to charge any fees or credit any overpayments relating to this application to deposit account number 18-2055.

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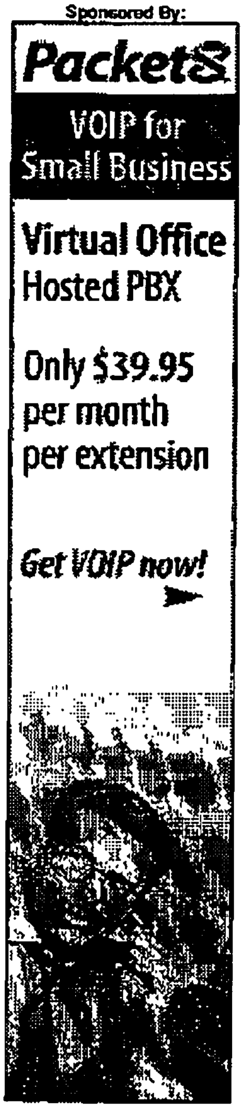
ATTACHMENTS:

- PTO-2038 ($1,020)
- http://computer.howstuffworks.com/inkjet-printer3.htm
- http://people.howstuffworks.com/offset-printing2.htm
- http://www.techsolve.org/p2iris/printing/2313-s.htm



How Offset Printing Works

by Mark Mine

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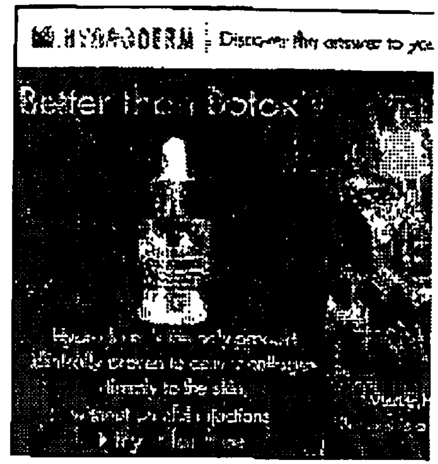

There are nine main types of printing processes:

- **offset lithography** - what we are exploring in this article
- **engraving** - think fine stationery
- **thermography** - raised printing, used in stationery
- **reprographics** - copying and duplicating
- **digital printing** - limited now, but the technology is exploding
- **letterpress** - the original process (hardly done anymore)
- **screen** - used for T-shirts and billboards
- **flexography** - usually used on packaging, such as can labels
- **gravure** - used for huge runs of magazines and direct-mail catalogs

Offset lithography is the workhorse of printing. Almost every commercial printer does it. But the quality of the final product is often due to the guidance, expertise and equipment provided by the printer.

Offset lithography works on a very simple principle: ink and water don't mix. Images (words and art) are put on plates (see the next section for more on this), which are dampened first by water, then ink. The ink adheres to the image area, the water to the non-image area. Then the image is transferred to a rubber blanket, and from the rubber blanket to paper. That's why the process is called "offset" – the image does not go directly to the paper from the plates, as it does in gravure printing.

Now, let's look at the steps in the printing process.

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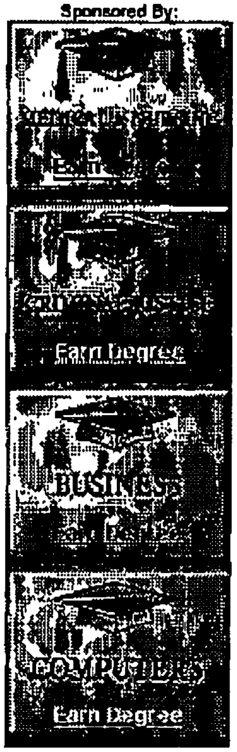

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How Inkjet Printers Work

by Jeff Tyson

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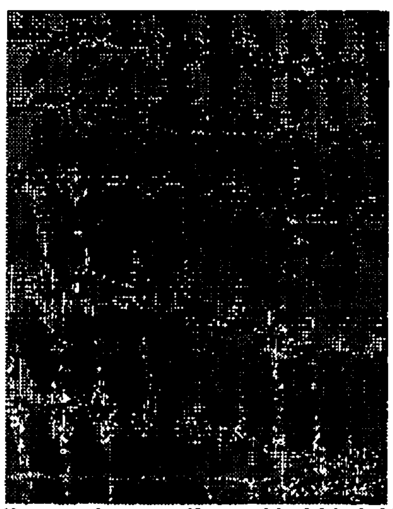
Heat vs. Vibration

Different types of inkjet printers form their droplets of ink in different ways. There are two main inkjet technologies currently used by printer manufacturers:



View of the nozzles on a thermal bubble inkjet print head

- **Thermal bubble** - Used by manufacturers such as Canon and Hewlett Packard, this method is commonly referred to as **bubble jet**. In a thermal inkjet printer, tiny resistors create heat, and this heat vaporizes ink to create a bubble. As the bubble expands, some of the ink is pushed out of a nozzle onto the paper. When the bubble "pops" (collapses), a vacuum is created. This pulls more ink into the print head from the cartridge. A typical bubble jet print head has 300 or 600 tiny nozzles, and all of them can fire a droplet simultaneously.

Categories
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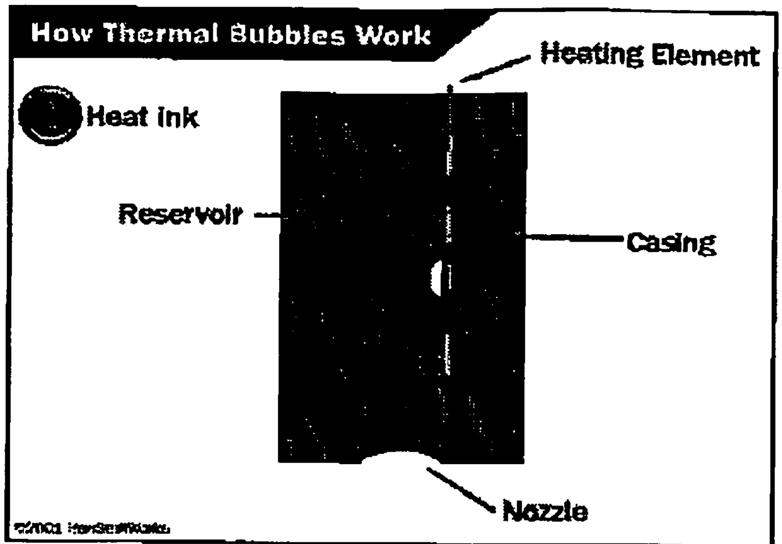
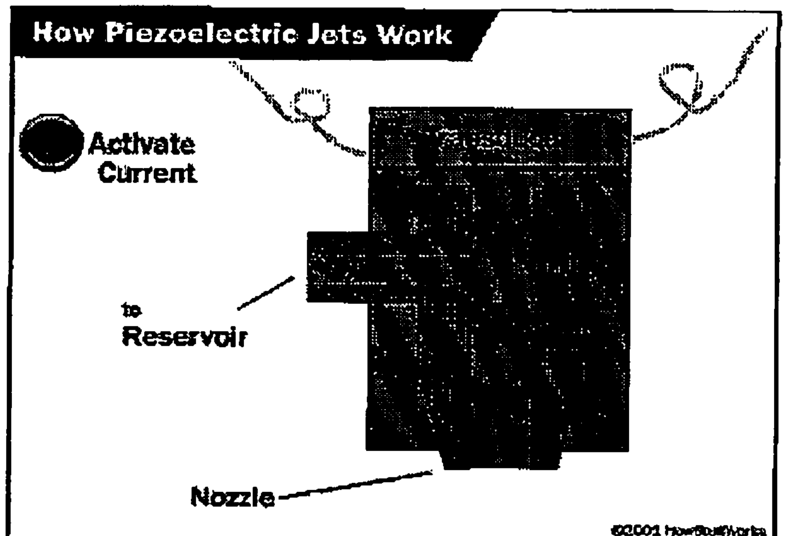
> Software



Click the button to see how a thermal bubble inkjet printer works.

- **Piezoelectric** - Patented by Epson, this technology uses **piezo crystals.** A crystal is located at the back of the ink reservoir of each nozzle. The crystal receives a tiny electric charge that causes it to vibrate. When the crystal vibrates inward, it forces a tiny amount of ink out of the nozzle. When it vibrates out, it pulls some more ink into the reservoir to replace the ink sprayed out.



Click on the button to see how a piezoelectric inkjet printer works.

Let's walk through the printing process to see just what happens.

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P2IRIS

Printing

INK MANAGEMENT

Sheetfed offset lithographic inks have a paste-like consistency and differ from most other types of inks (such as flexographic or gravure inks) in that they normally dry by oxidation/polymerization and adsorption (into the substrate) rather than by evaporation (i.e., evaporating the solvent portion of an ink).

Sheetfed lithographic inks are composed of:

- pigment (provides color);
- vehicle (provides body);
- drier (enhances oxidation/polymerization) and
- additives (enhance or add specific print characteristics).

Pigments are derived from either organic or inorganic compounds. Environmental and health concerns over metals such as chromium, cadmium, lead and mercury has greatly reduced the use of these compounds in printing ink pigments. Pigments are discrete particles, which are finely ground in the manufacturing process and must be dispersed into a vehicle (or varnish).

The ink vehicle provides body to a printing ink. Vehicles carry pigment and also serve to bind or attach ink to the substrate. Sheetfed vehicles may contain linseed oil, dehydrated castor oil, chinawood (tung) oil, soya oil, synthetic resins (such as phenolics, urethanes, maleics, acrylics, and epoxides), and high boiling petroleum hydrocarbons (commonly termed maggie oils).

Ultraviolet (UV) inks contain vehicles that cure by polymerization upon exposure to an UV light source. UV vehicles contain acrylic prepolymers (termed oligomers) and a photosensitizer (termed photoinitiator). Electron beam (EB) inks are similar, but do not contain a photosensitizer. EB inks cure by polymerization upon exposure to an EB source.

Driers are commonly used for sheetfed printing in order to enhance drying and meet short job turn-around times. Two of the more common materials used as driers are cobalt and manganese. Driers enhance the oxidation/polymerization action of the ink vehicle.

Additives are used to provide additional desireable performance characteristics to the printed ink film. Additives such as plasticizers and waxes impart flexability and slipperiness to the ink film. Other additives can alter the body, or "tack" of the ink.

Estimating/Ordering Ink
In the process of determining a cost for printing a certain job, the printer must estimate the amount and type of ink that will be required. Printers normally work closely with ink suppliers, in fact, many of the larger printers maintain an in-house ink system staffed by the ink supplier.

Some printers have found it economical to designate an ink manager to mix ink to custom color requirements rather than purchasing a custom color from their ink supplier. By performing this work in-house, they are able to mix exactly the quantity they need, rather than purchase a minimum quantity of ink. The ink manager must also supervise pressmen on second or third shift that will be trained to mix/match ink colors.

Receiving Ink
Lithographic ink is normally shipped in 1-pound or 5-pound cans. Ink may also be supplied in plastic containers called "kits". The ink can, or kit, contains a layer of wax paper inside of the lid to prevent oxidation of the ink. Lithographic ink that begins to oxidize (dry) by exposure to air will develop a "skin". Ink "skin" is unusable and must be discarded. For larger lithographic operations, particularly heatset web, ink may be shipped to the facility in 55 gallon drums or even 250 gallon totes. Drums and totes of ink are normally supplied for the four process colors (magenta, cyan, yellow and black).